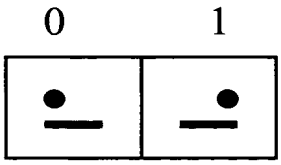


FIG. 1

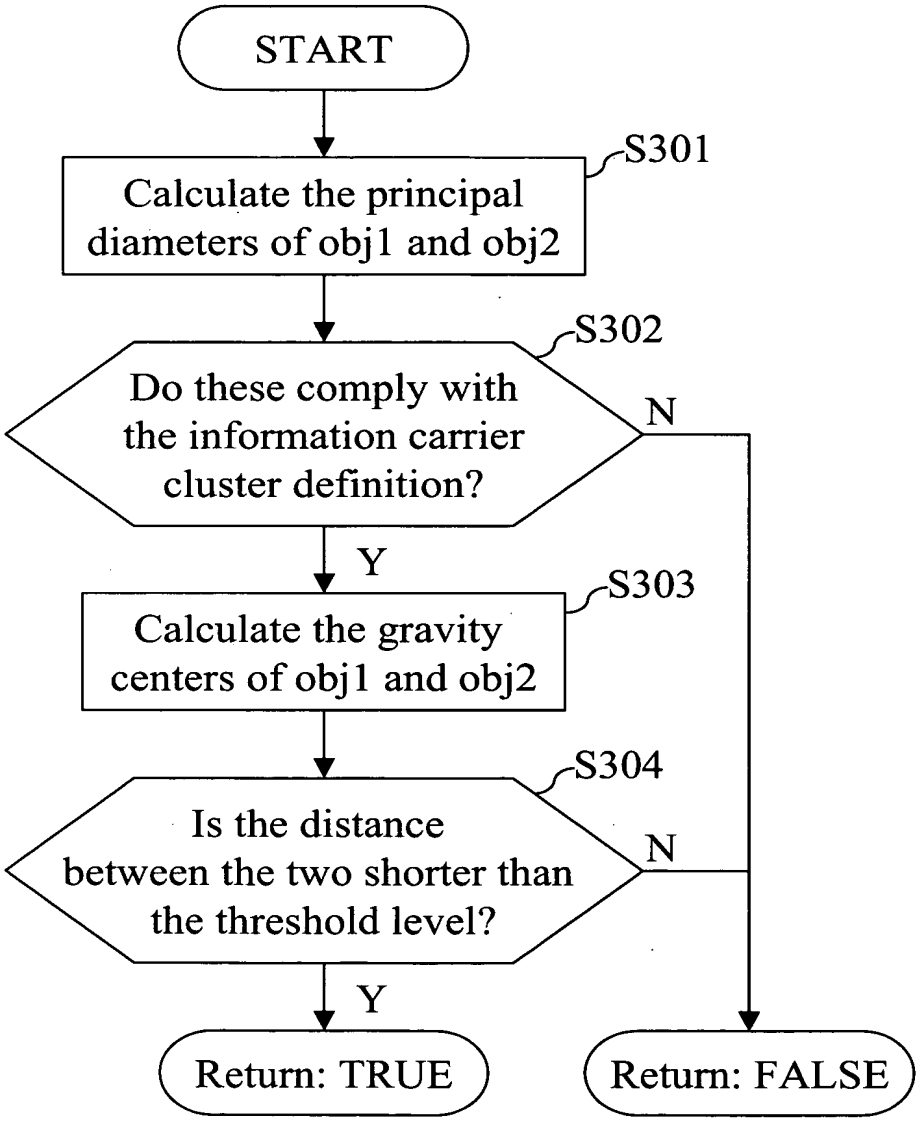


FIG. 2

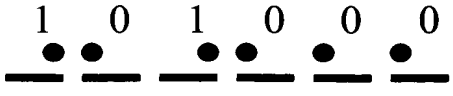


FIG. 3

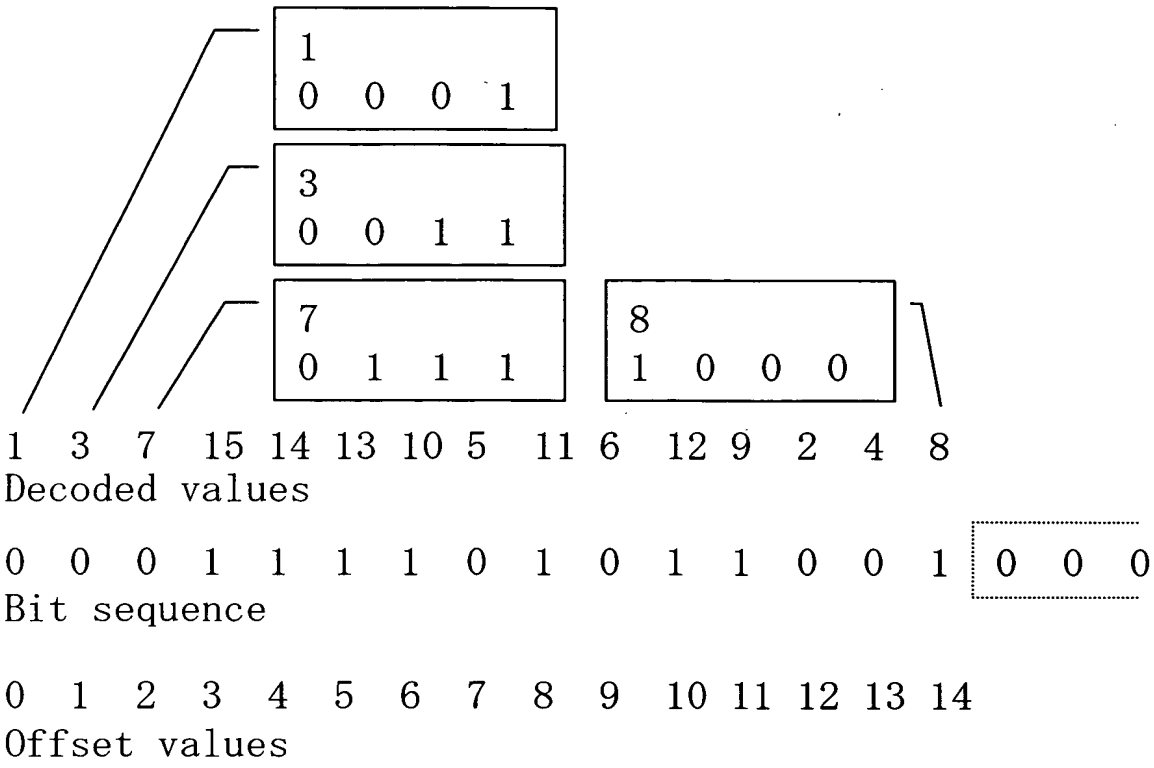

1
0 0 0 1
3
0 0 1 1
7
0 1 1 1
8
1 0 0 0
1 3 7 15 14 13 10 5 11 6 12 9 2 4 8
Decoded values
0 0 0 1 1 1 1 0 1 0 1 1 0 0 1 0 0 0
Bit sequence
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Offset values

FIG. 4

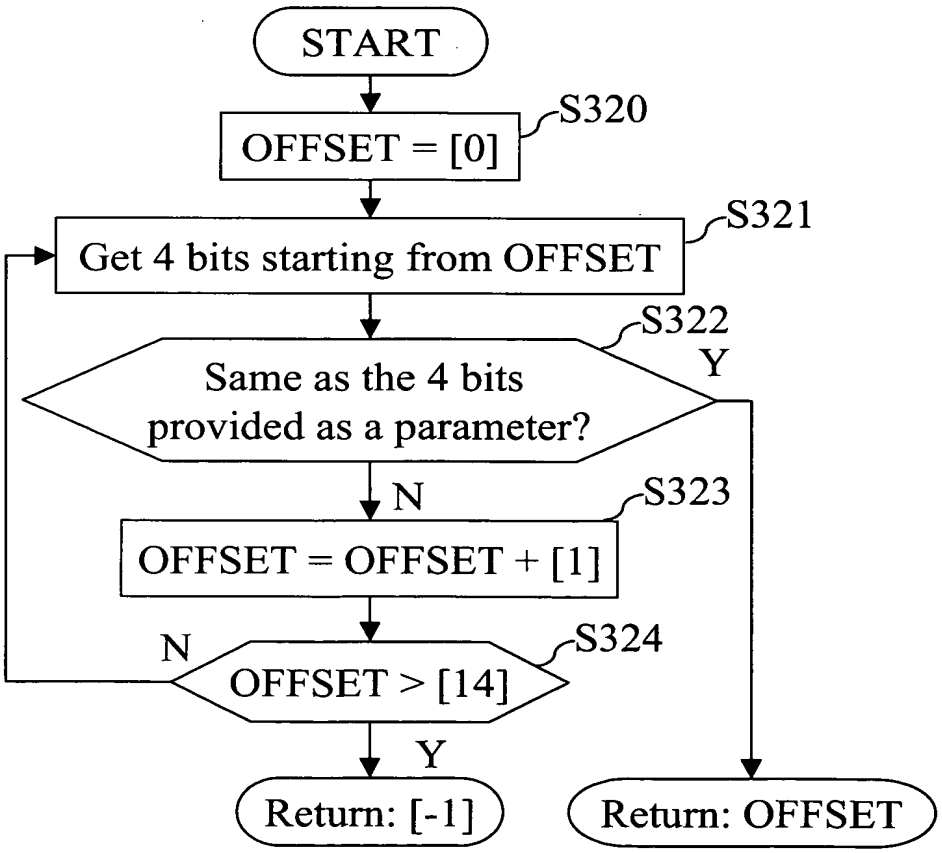

START
OFFSET = [0]
S320
Get 4 bits starting from OFFSET
S321
Same as the 4 bits provided as a parameter?
S322
Y
N
OFFSET = OFFSET + [1]
S323
N
OFFSET > [14]
S324
Y
Return: [-1]
Return: OFFSET

FIG. 5

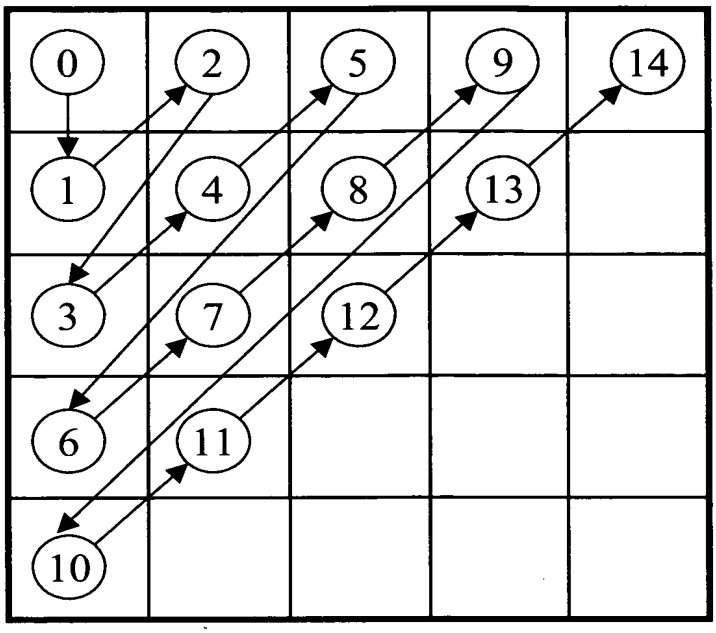

0
2
5
9
14
1
4
8
13
3
7
12
6
11
10

FIG. 6

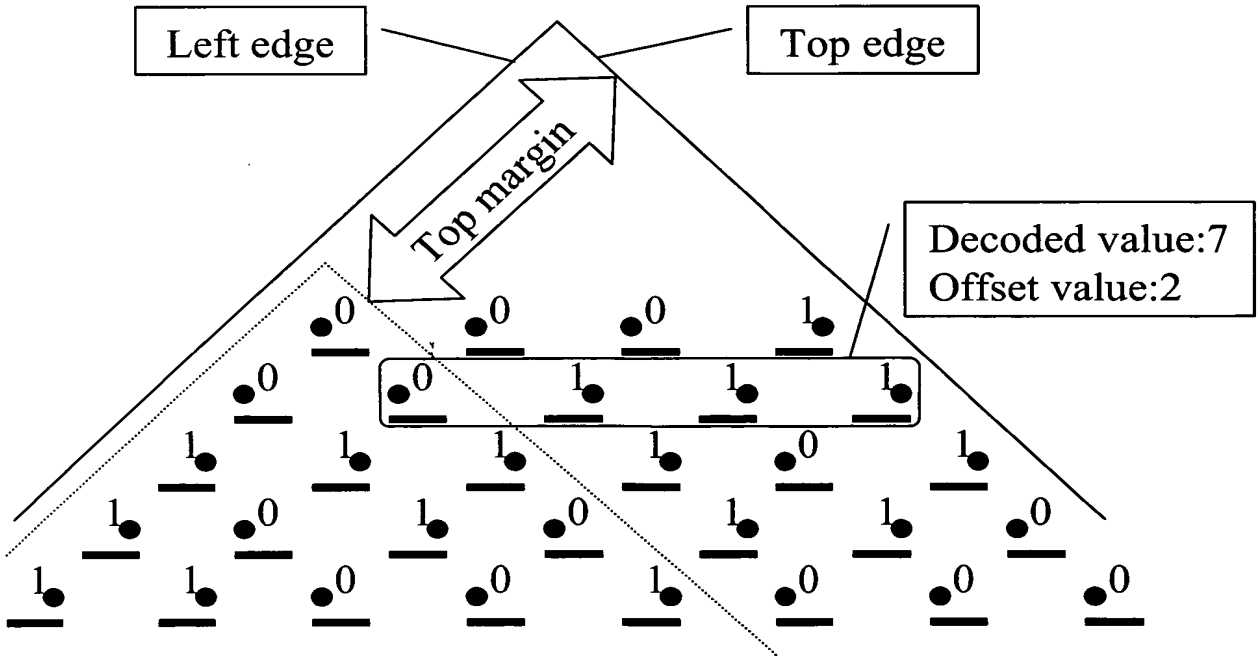

Left edge
Top edge
Top margin
Decoded value:7
Offset value:2

FIG. 7

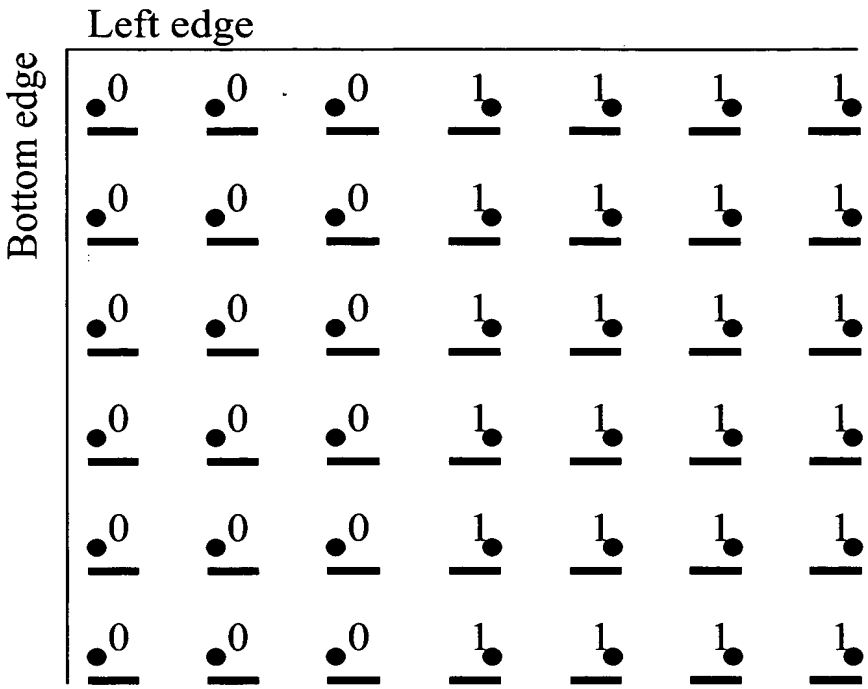


FIG. 8

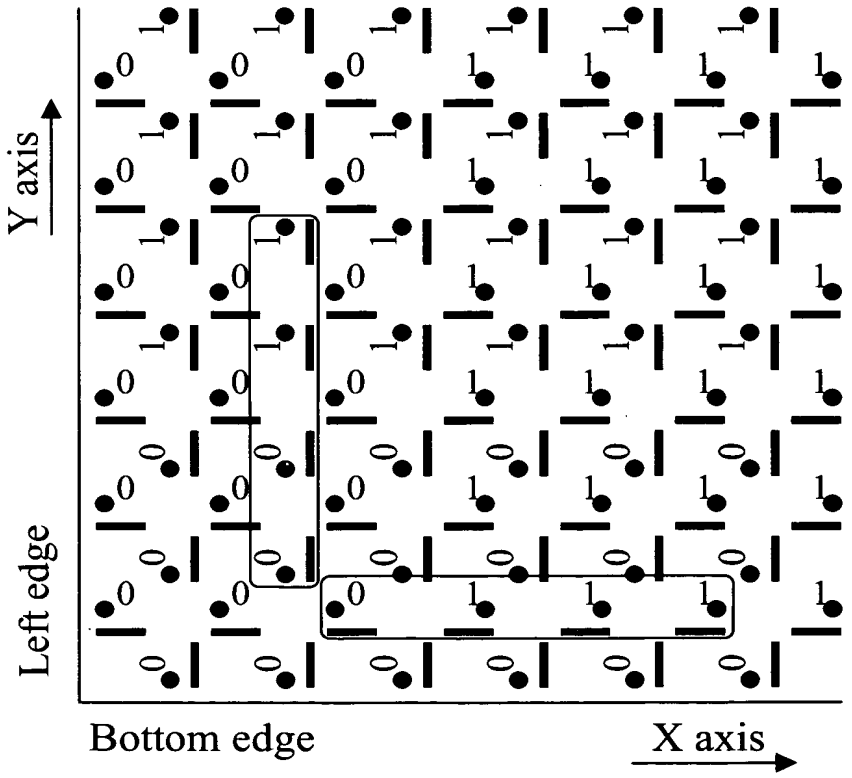


FIG. 9

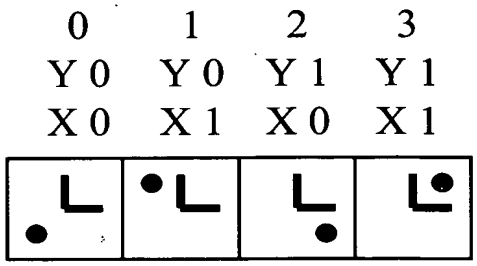


FIG. 10

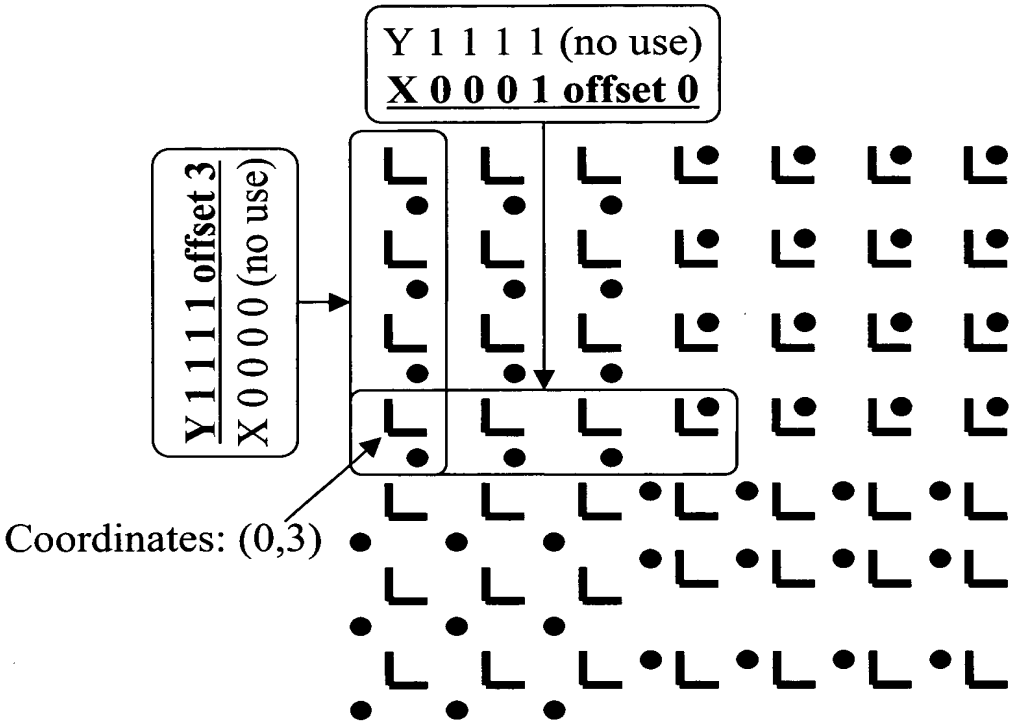


FIG. 11

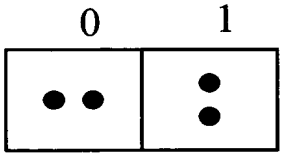


FIG. 12

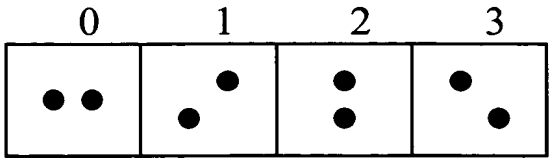


FIG. 13

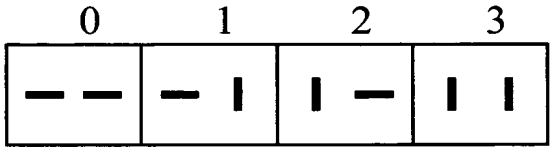


FIG. 14

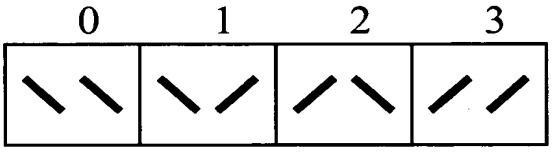


FIG. 15

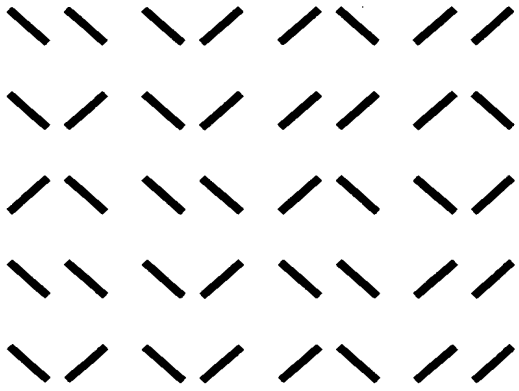


FIG. 16

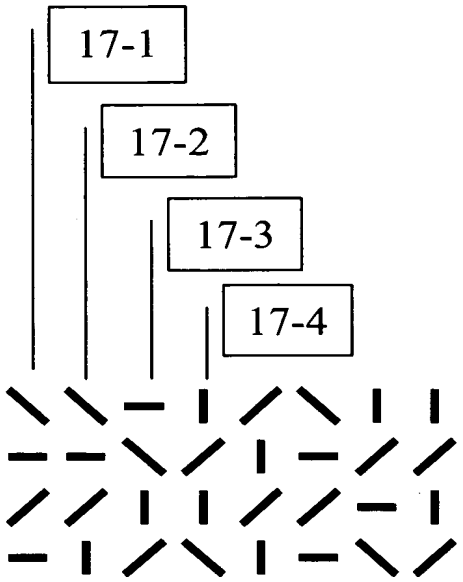


FIG. 17

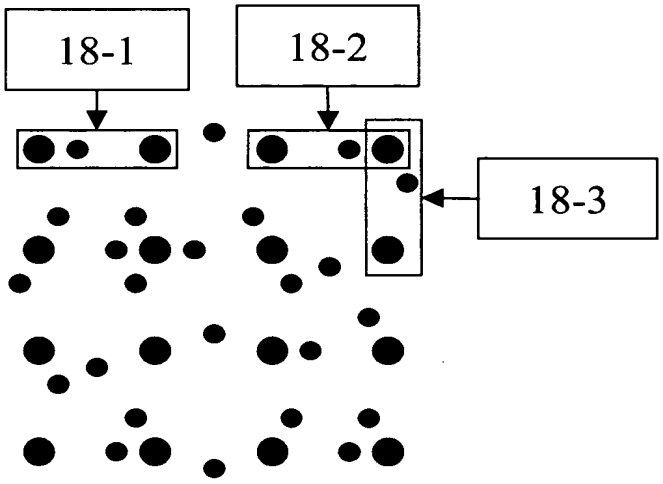


FIG. 18

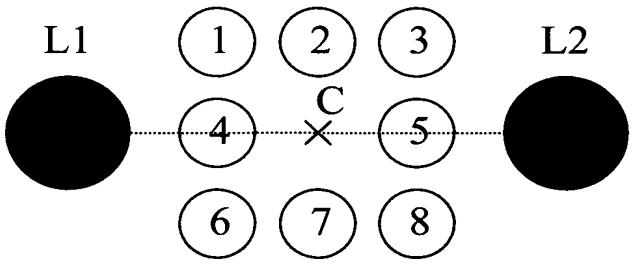


FIG. 19

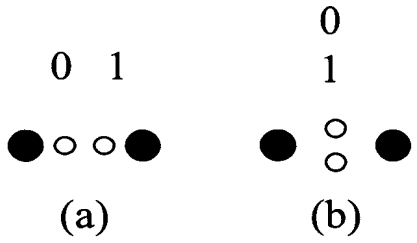


FIG. 20

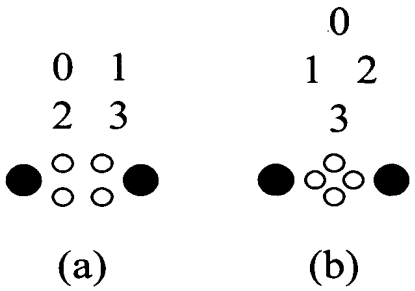


FIG. 21

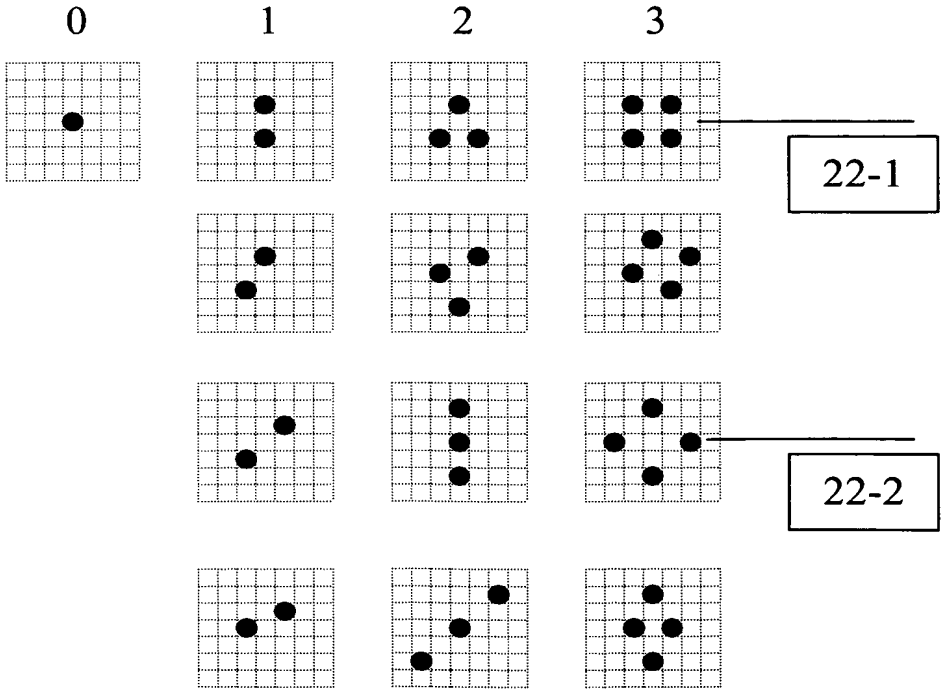


FIG. 22

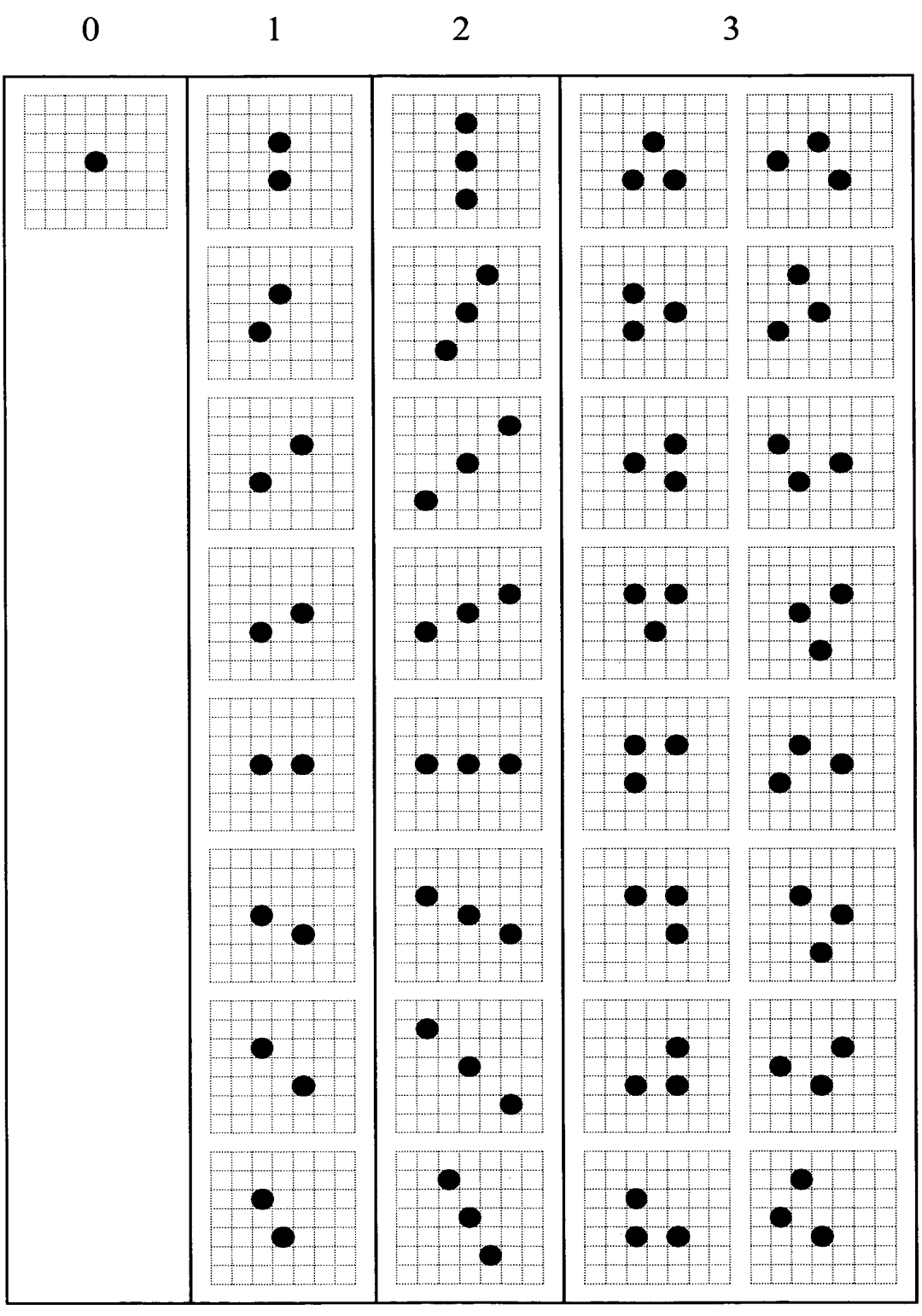


FIG. 23

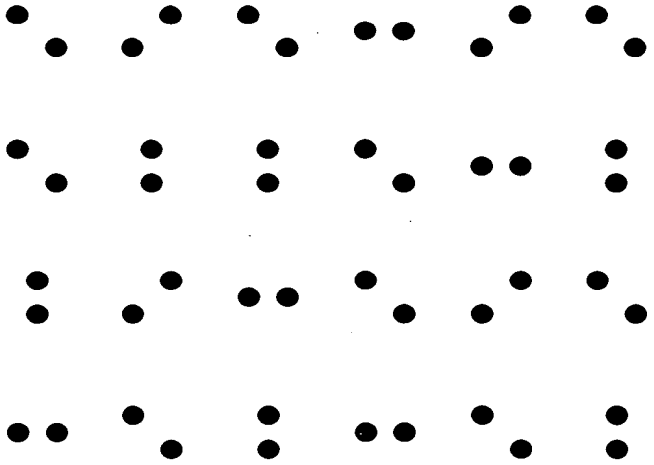


FIG. 24

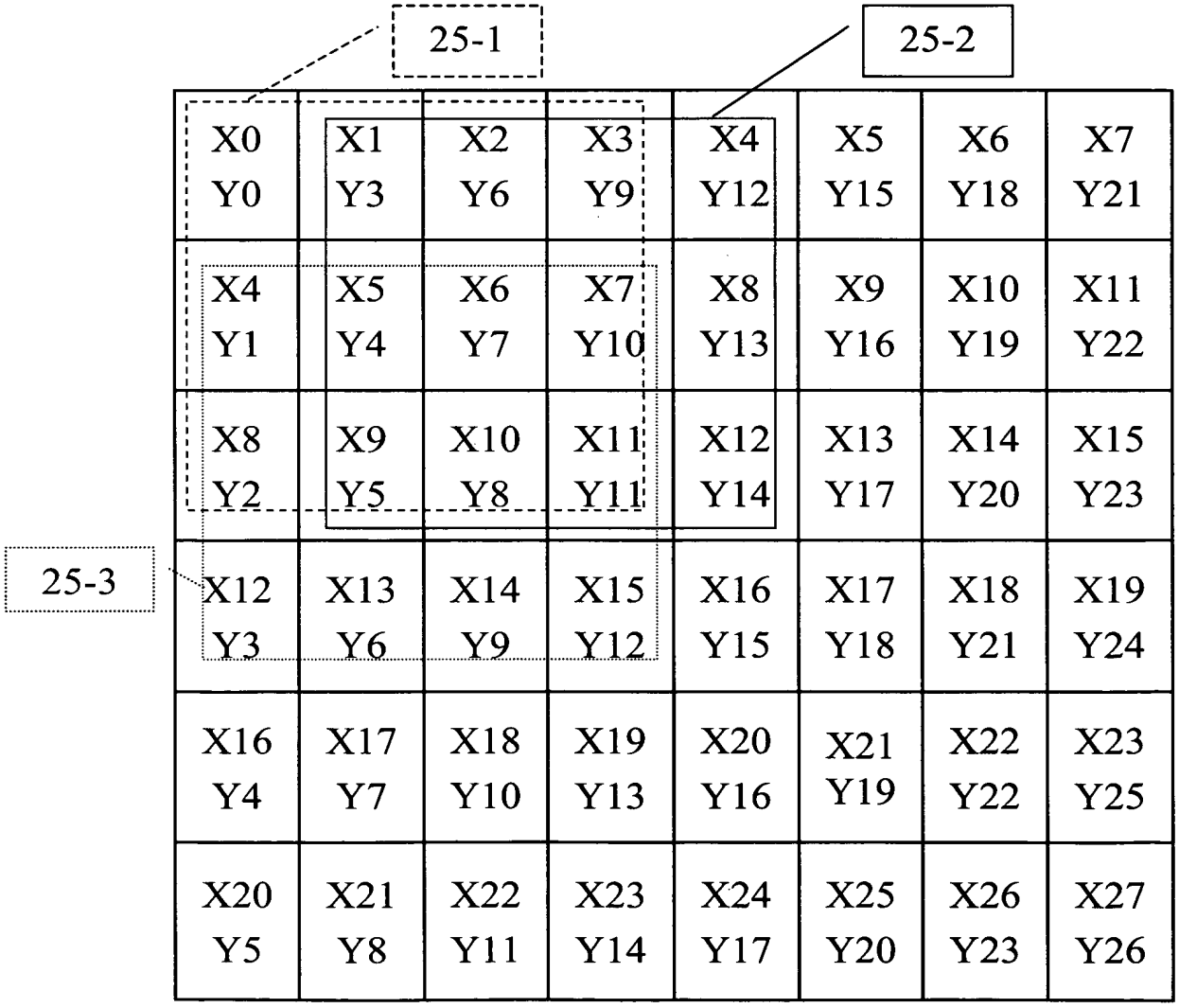
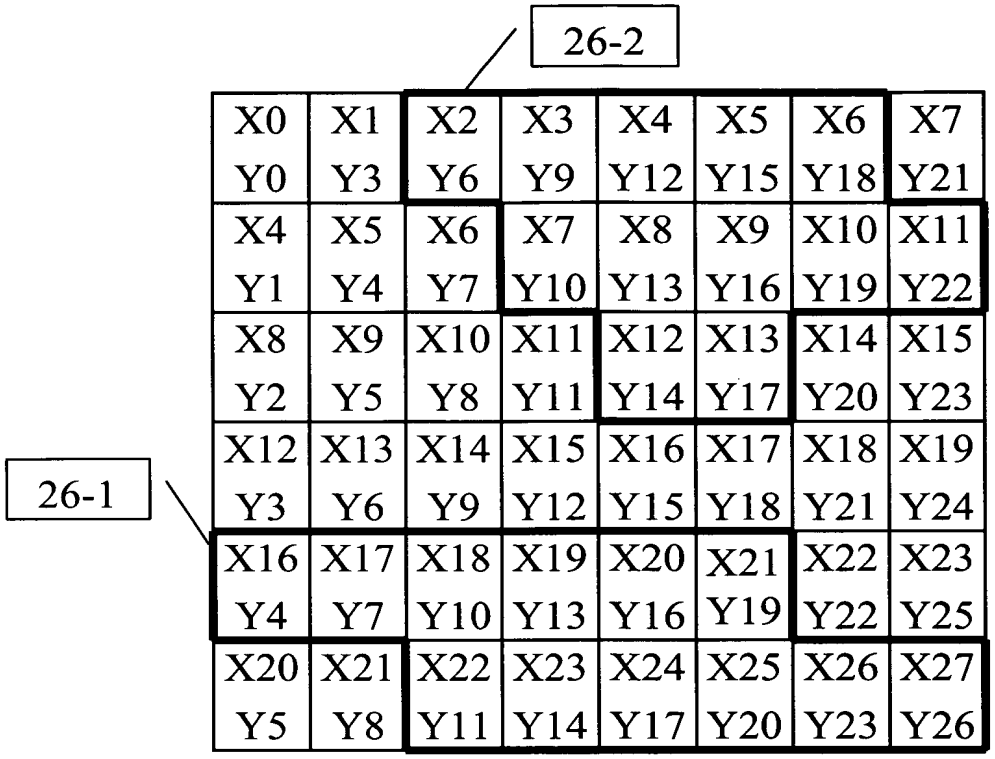
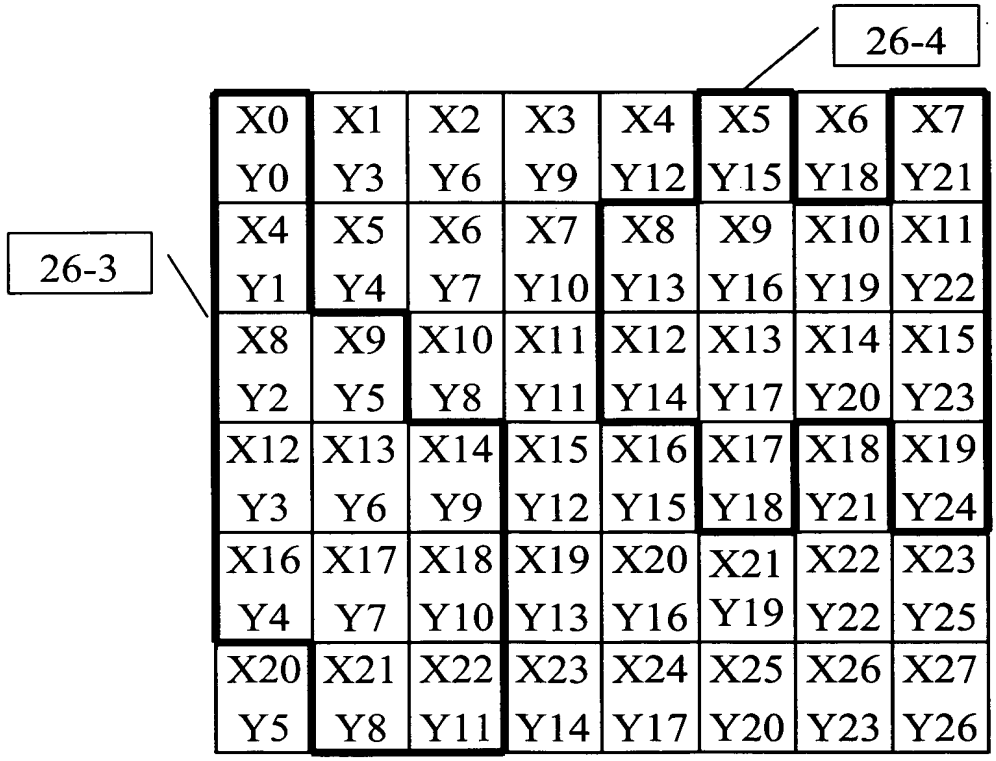

25-1
25-2
25-3
X0 Y0
X1 Y3
X2 Y6
X3 Y9
X4 Y12
X5 Y15
X6 Y18
X7 Y21
X4 Y1
X5 Y4
X6 Y7
X7 Y10
X8 Y13
X9 Y16
X10 Y19
X11 Y22
X8 Y2
X9 Y5
X10 Y8
X11 Y11
X12 Y14
X13 Y17
X14 Y20
X15 Y23
X12 Y3
X13 Y6
X14 Y9
X15 Y12
X16 Y15
X17 Y18
X18 Y21
X19 Y24
X16 Y4
X17 Y7
X18 Y10
X19 Y13
X20 Y16
X21 Y19
X22 Y22
X23 Y25
X20 Y5
X21 Y8
X22 Y11
X23 Y14
X24 Y17
X25 Y20
X26 Y23
X27 Y26

FIG. 25

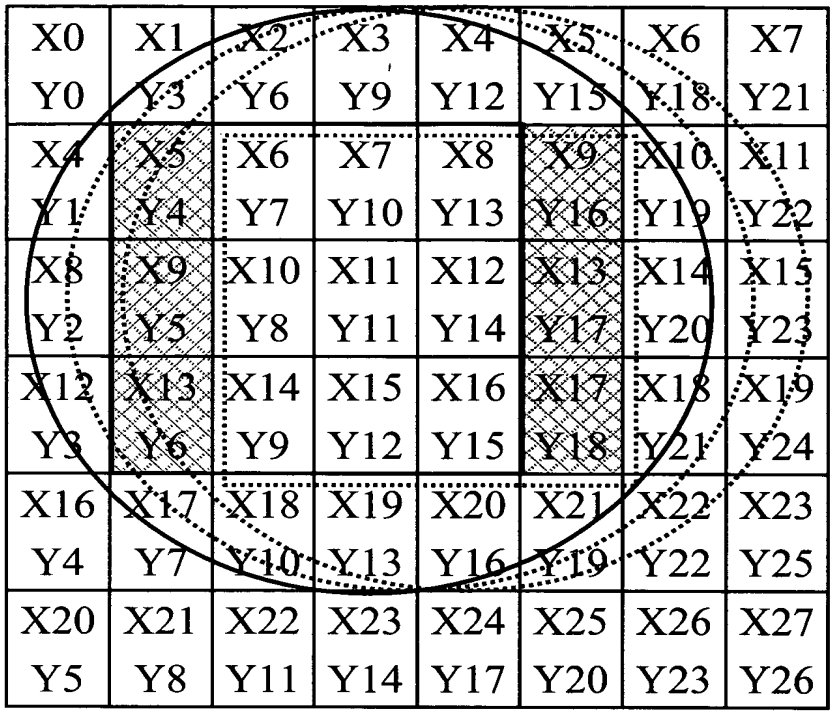

26-2
26-1
X0 X1 X2 X3 X4 X5 X6 X7
Y0 Y3 Y6 Y9 Y12 Y15 Y18 Y21
X4 X5 X6 X7 X8 X9 X10 X11
Y1 Y4 Y7 Y10 Y13 Y16 Y19 Y22
X8 X9 X10 X11 X12 X13 X14 X15
Y2 Y5 Y8 Y11 Y14 Y17 Y20 Y23
X12 X13 X14 X15 X16 X17 X18 X19
Y3 Y6 Y9 Y12 Y15 Y18 Y21 Y24
X16 X17 X18 X19 X20 X21 X22 X23
Y4 Y7 Y10 Y13 Y16 Y19 Y22 Y25
X20 X21 X22 X23 X24 X25 X26 X27
Y5 Y8 Y11 Y14 Y17 Y20 Y23 Y26

(a)

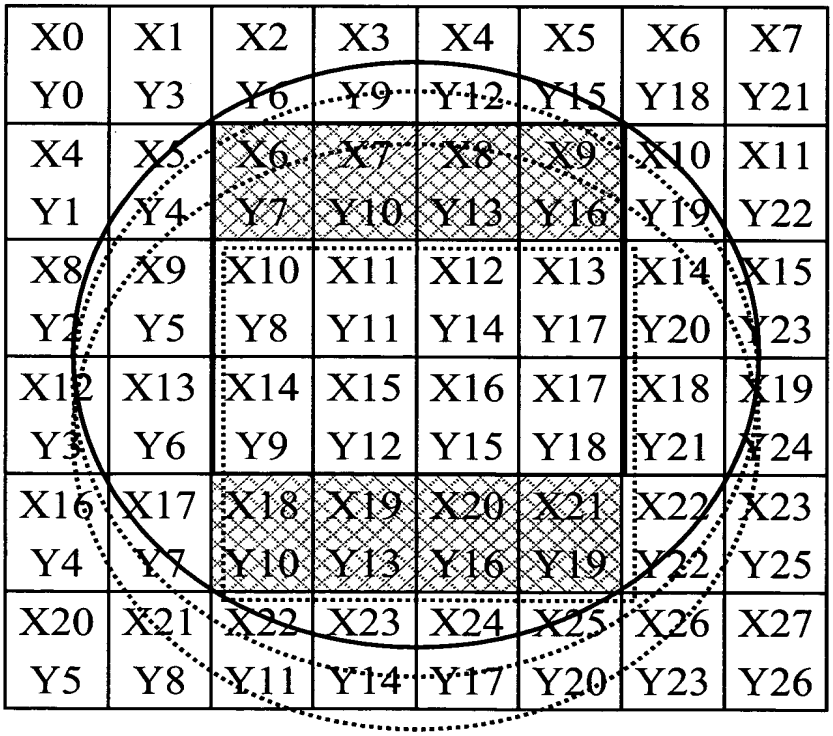

26-4
26-3
X0 X1 X2 X3 X4 X5 X6 X7
Y0 Y3 Y6 Y9 Y12 Y15 Y18 Y21
X4 X5 X6 X7 X8 X9 X10 X11
Y1 Y4 Y7 Y10 Y13 Y16 Y19 Y22
X8 X9 X10 X11 X12 X13 X14 X15
Y2 Y5 Y8 Y11 Y14 Y17 Y20 Y23
X12 X13 X14 X15 X16 X17 X18 X19
Y3 Y6 Y9 Y12 Y15 Y18 Y21 Y24
X16 X17 X18 X19 X20 X21 X22 X23
Y4 Y7 Y10 Y13 Y16 Y19 Y22 Y25
X20 X21 X22 X23 X24 X25 X26 X27
Y5 Y8 Y11 Y14 Y17 Y20 Y23 Y26

(b)

FIG. 26


X0 X1 X2 X3 X4 X5 X6 X7
Y0 Y3 Y6 Y9 Y12 Y15 Y18 Y21
X4 X5 X6 X7 X8 X9 X10 X11
Y1 Y4 Y7 Y10 Y13 Y16 Y19 Y22
X8 X9 X10 X11 X12 X13 X14 X15
Y2 Y5 Y8 Y11 Y14 Y17 Y20 Y23
X12 X13 X14 X15 X16 X17 X18 X19
Y3 Y6 Y9 Y12 Y15 Y18 Y21 Y24
X16 X17 X18 X19 X20 X21 X22 X23
Y4 Y7 Y10 Y13 Y16 Y19 Y22 Y25
X20 X21 X22 X23 X24 X25 X26 X27
Y5 Y8 Y11 Y14 Y17 Y20 Y23 Y26

(a)


X0 X1 X2 X3 X4 X5 X6 X7
Y0 Y3 Y6 Y9 Y12 Y15 Y18 Y21
X4 X5 X6 X7 X8 X9 X10 X11
Y1 Y4 Y7 Y10 Y13 Y16 Y19 Y22
X8 X9 X10 X11 X12 X13 X14 X15
Y2 Y5 Y8 Y11 Y14 Y17 Y20 Y23
X12 X13 X14 X15 X16 X17 X18 X19
Y3 Y6 Y9 Y12 Y15 Y18 Y21 Y24
X16 X17 X18 X19 X20 X21 X22 X23
Y4 Y7 Y10 Y13 Y16 Y19 Y22 Y25
X20 X21 X22 X23 X24 X25 X26 X27
Y5 Y8 Y11 Y14 Y17 Y20 Y23 Y26

(b)

FIG. 27

X0	X1	X2	X3	X4	X5	X6	X7
Y0	Y3	Y6	Y9	Y12	Y15	Y18	Y21
X4	X5	X6	X7	X8	X9	X10	X11
Y1	Y4	Y7	Y10	Y13	Y16	Y19	Y22
X8	X9	X10	X11	X12	X13	X14	X15
Y2	Y5	Y8	Y11	Y14	Y17	Y20	Y23
X12	X13	X14	X15	X16	X17	X18	X19
Y3	Y6	Y9	Y12	Y15	Y18	Y21	Y24
X16	X17	X18	X19	X20	X21	X22	X23
Y4	Y7	Y10	Y13	Y16	Y19	Y22	Y25
X20	X21	X22	X23	X24	X25	X26	X27
Y5	Y8	Y11	Y14	Y17	Y20	Y23	Y26

(a)

X0	X1	X2	X3	X4	X5	X6	X7
Y0	Y3	Y6	Y9	Y12	Y15	Y18	Y21
X4	X5	X6	X7	X8	X9	X10	X11
Y1	Y4	Y7	Y10	Y13	Y16	Y19	Y22
X8	X9	X10	X11	X12	X13	X14	X15
Y2	Y5	Y8	Y11	Y14	Y17	Y20	Y23
X12	X13	X14	X15	X16	X17	X18	X19
Y3	Y6	Y9	Y12	Y15	Y18	Y21	Y24
X16	X17	X18	X19	X20	X21	X22	X23
Y4	Y7	Y10	Y13	Y16	Y19	Y22	Y25
X20	X21	X22	X23	X24	X25	X26	X27
Y5	Y8	Y11	Y14	Y17	Y20	Y23	Y26

(b)

FIG. 28

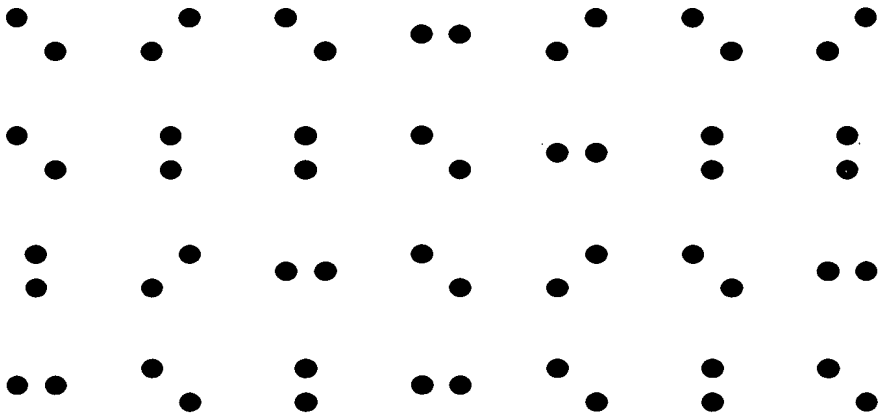


FIG. 29

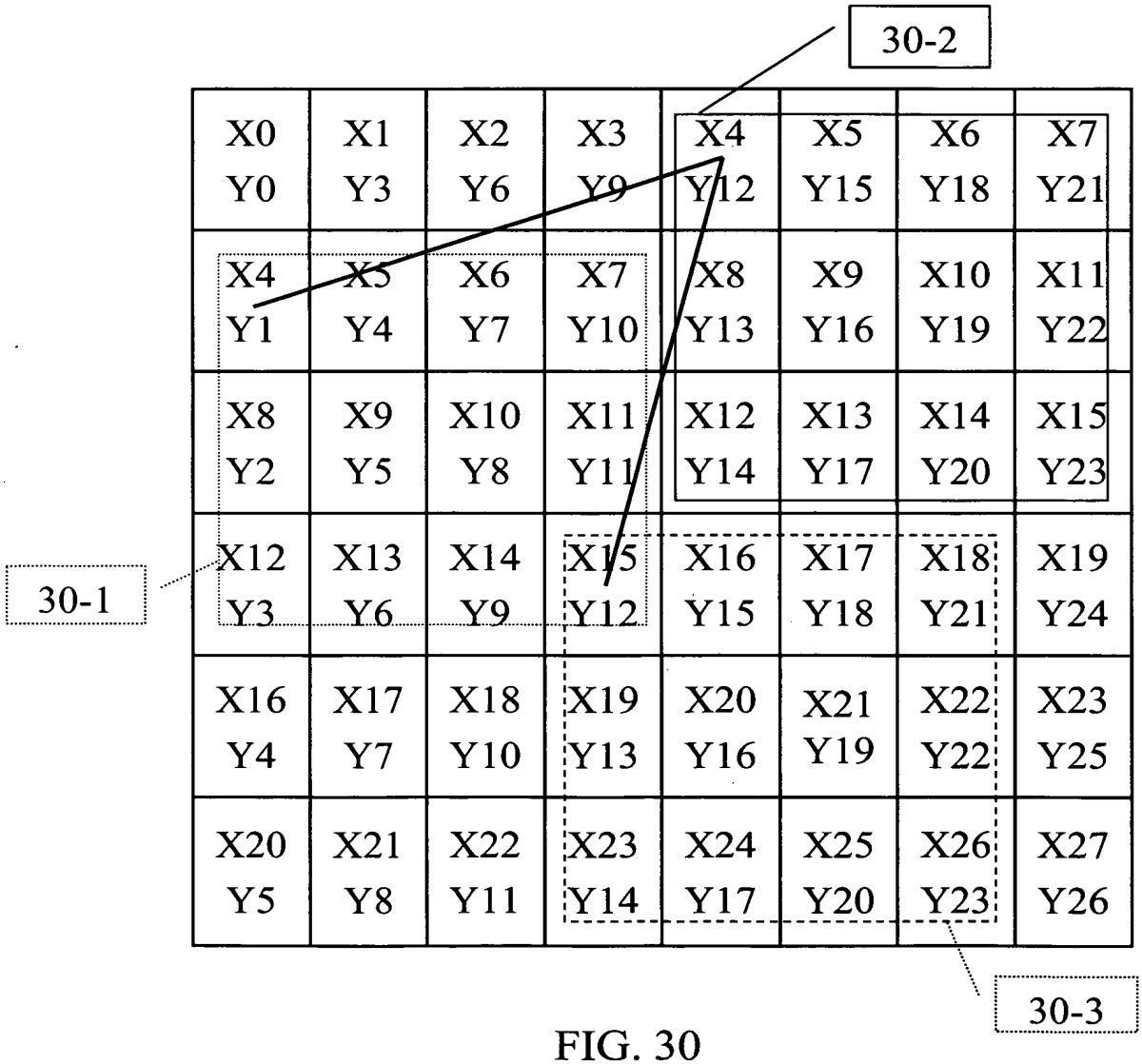

30-2
X0 Y0
X1 Y3
X2 Y6
X3 Y9
X4 Y12
X5 Y15
X6 Y18
X7 Y21
X4 Y1
X5 Y4
X6 Y7
X7 Y10
X8 Y13
X9 Y16
X10 Y19
X11 Y22
X8 Y2
X9 Y5
X10 Y8
X11 Y11
X12 Y14
X13 Y17
X14 Y20
X15 Y23
30-1
X12 Y3
X13 Y6
X14 Y9
X15 Y12
X16 Y15
X17 Y18
X18 Y21
X19 Y24
X16 Y4
X17 Y7
X18 Y10
X19 Y13
X20 Y16
X21 Y19
X22 Y22
X23 Y25
X20 Y5
X21 Y8
X22 Y11
X23 Y14
X24 Y17
X25 Y20
X26 Y23
X27 Y26
30-3

FIG. 30

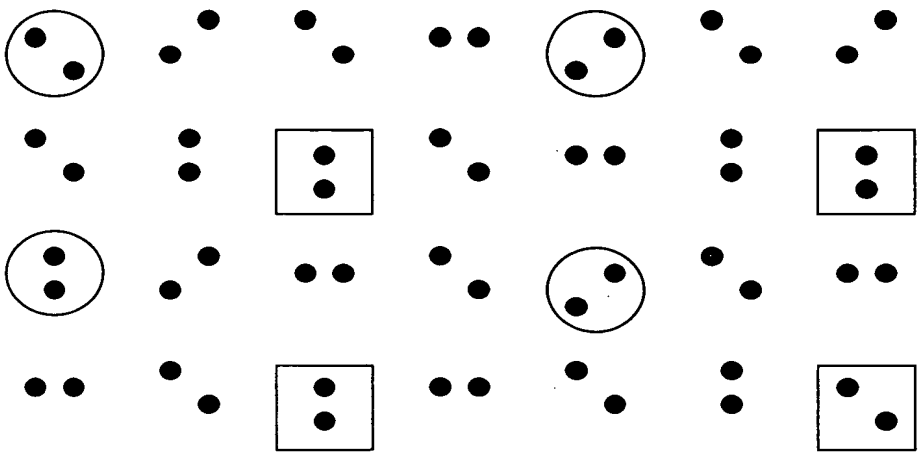


FIG. 31

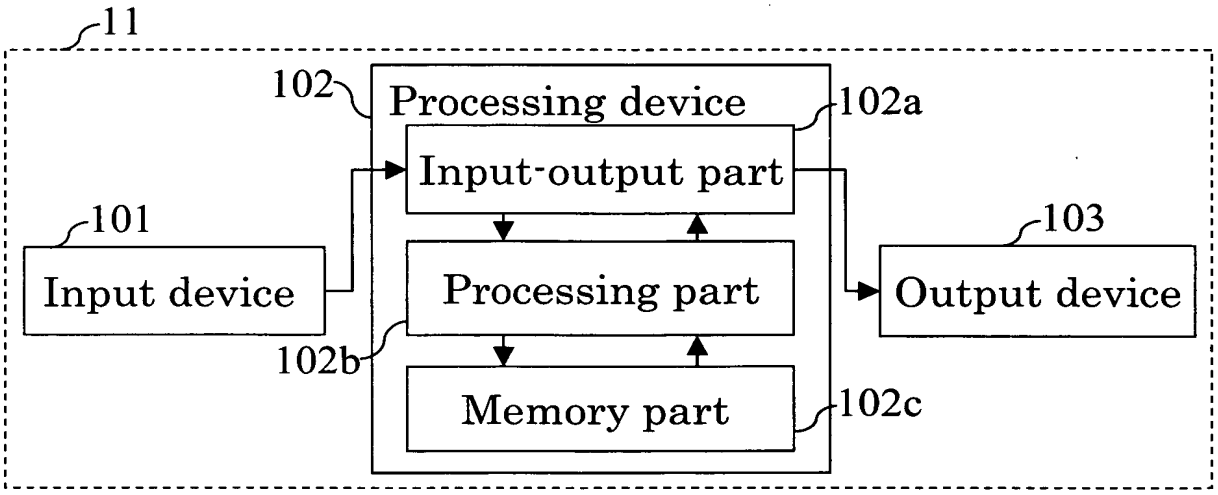

11
102
Processing device
102a
Input-output part
101
Input device
Processing part
103
Output device
102b
Memory part
102c

FIG. 32

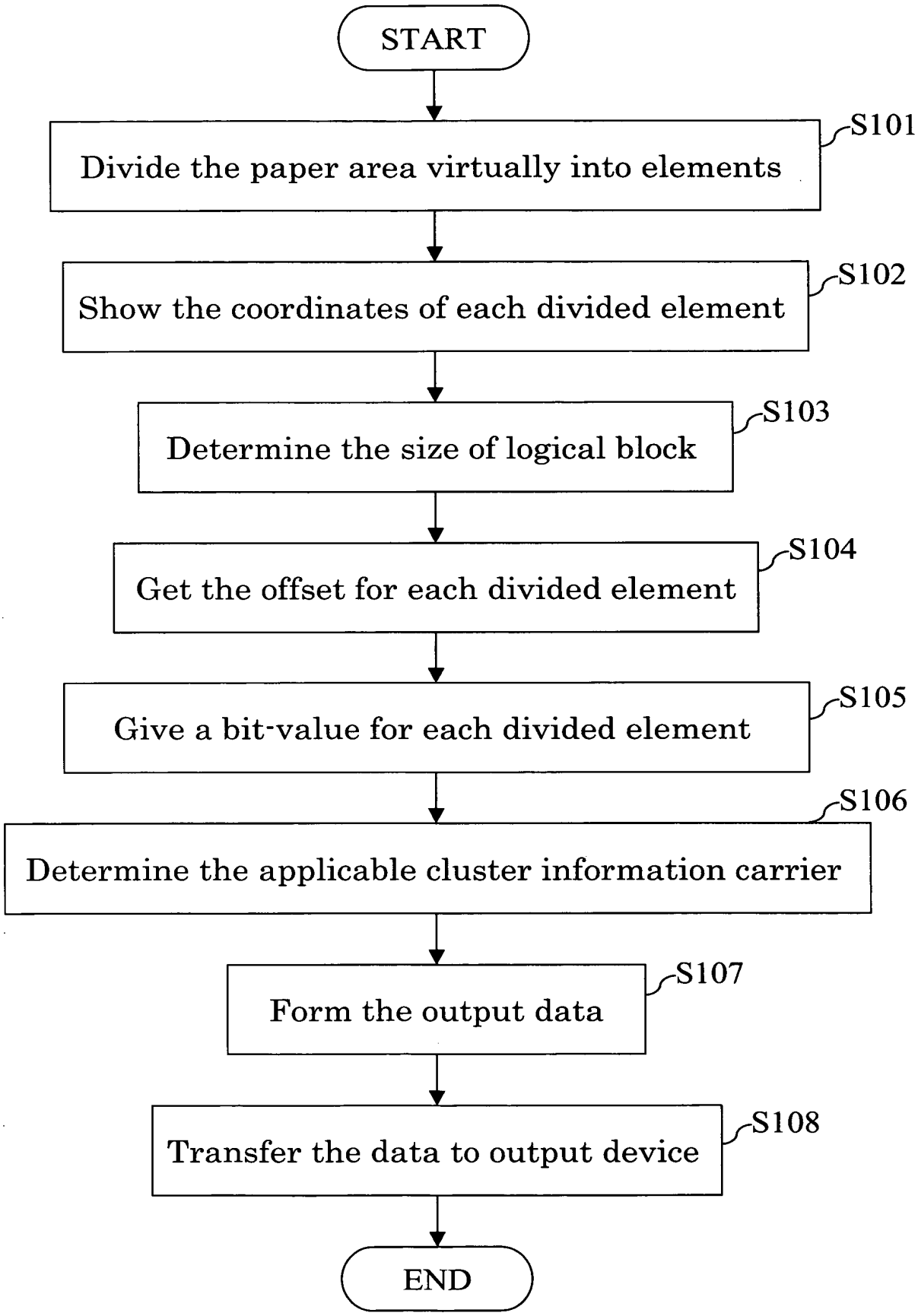

START
Divide the paper area virtually into elements
S101
Show the coordinates of each divided element
S102
Determine the size of logical block
S103
Get the offset for each divided element
S104
Give a bit-value for each divided element
S105
Determine the applicable cluster information carrier
S106
Form the output data
S107
Transfer the data to output device
S108
END

FIG. 33

111

0,0	1,0	2,0	3,0	4,0
0,1	1,1	2,1	3,1	4,1
0,2	1,2	2,2	3,2	4,2
0,3	1,3	2,3	3,3	4,3
0,4	1,4	2,4	3,4	4,4

(a)

0	1	2	3	4
2	3	4	5	6
4	5	6	7	8
6	7	8	9	10
8	9	10	11	12

(b)

0	0	0	1	1
0	1	1	1	1
1	1	1	0	1
1	0	1	0	1
1	0	1	1	0

(c)

0	2	4	6	8
1	3	5	7	9
2	4	6	8	10
3	5	7	9	11
4	6	8	10	12

(d)

FIG. 34-1

111

0	0	1	1	1
0	1	1	0	0
0	1	1	1	1
1	1	0	0	1
1	1	1	1	0

(e)

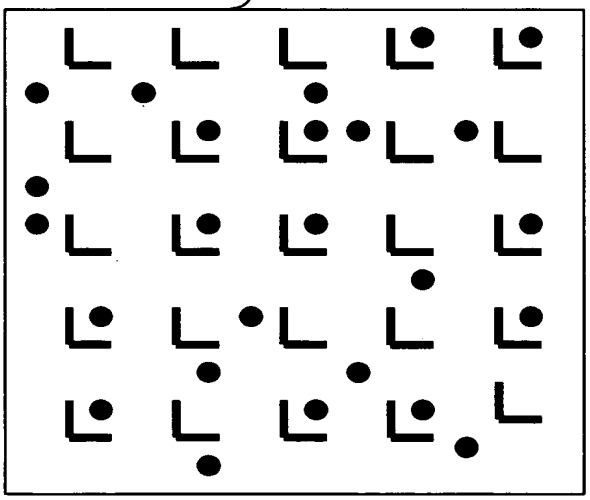
0,0	1,2	2,4	3,6	4,8
2,1	3,3	4,5	5,7	6,9
4,2	5,4	6,6	7,8	8,10
6,3	7,5	8,7	9,9	10,11
8,4	9,6	10,8	11,10	12,12

(f)

0,0	0,0	0,1	1,1	1,1
0,0	1,1	1,1	1,0	1,0
1,0	1,1	1,1	0,1	1,1
1,1	0,1	1,0	0,0	1,1
1,1	0,1	1,1	1,1	0,0

(g)

112



(h)

FIG. 34-2

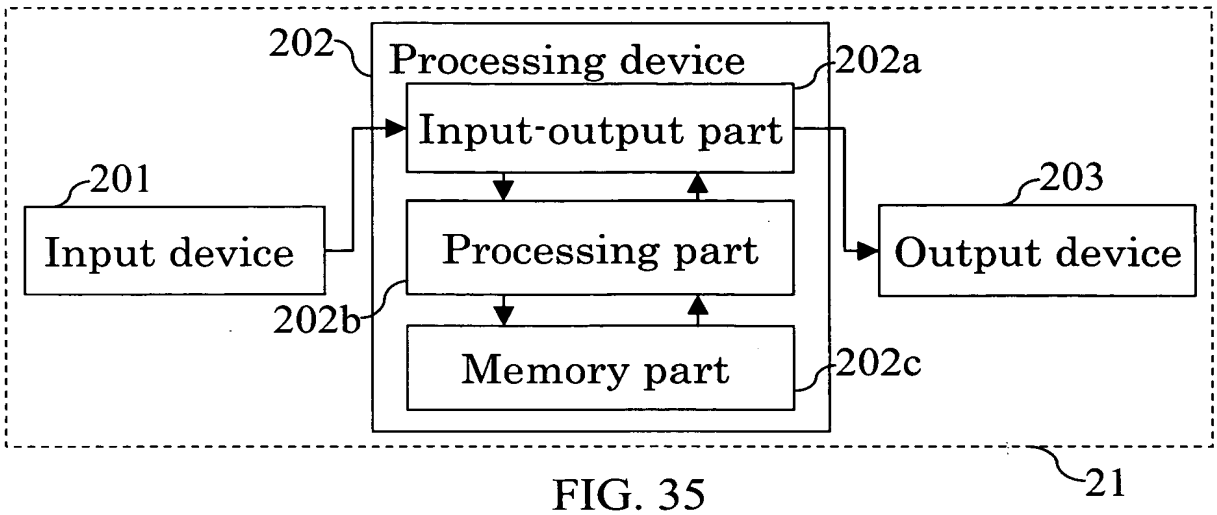


FIG. 35

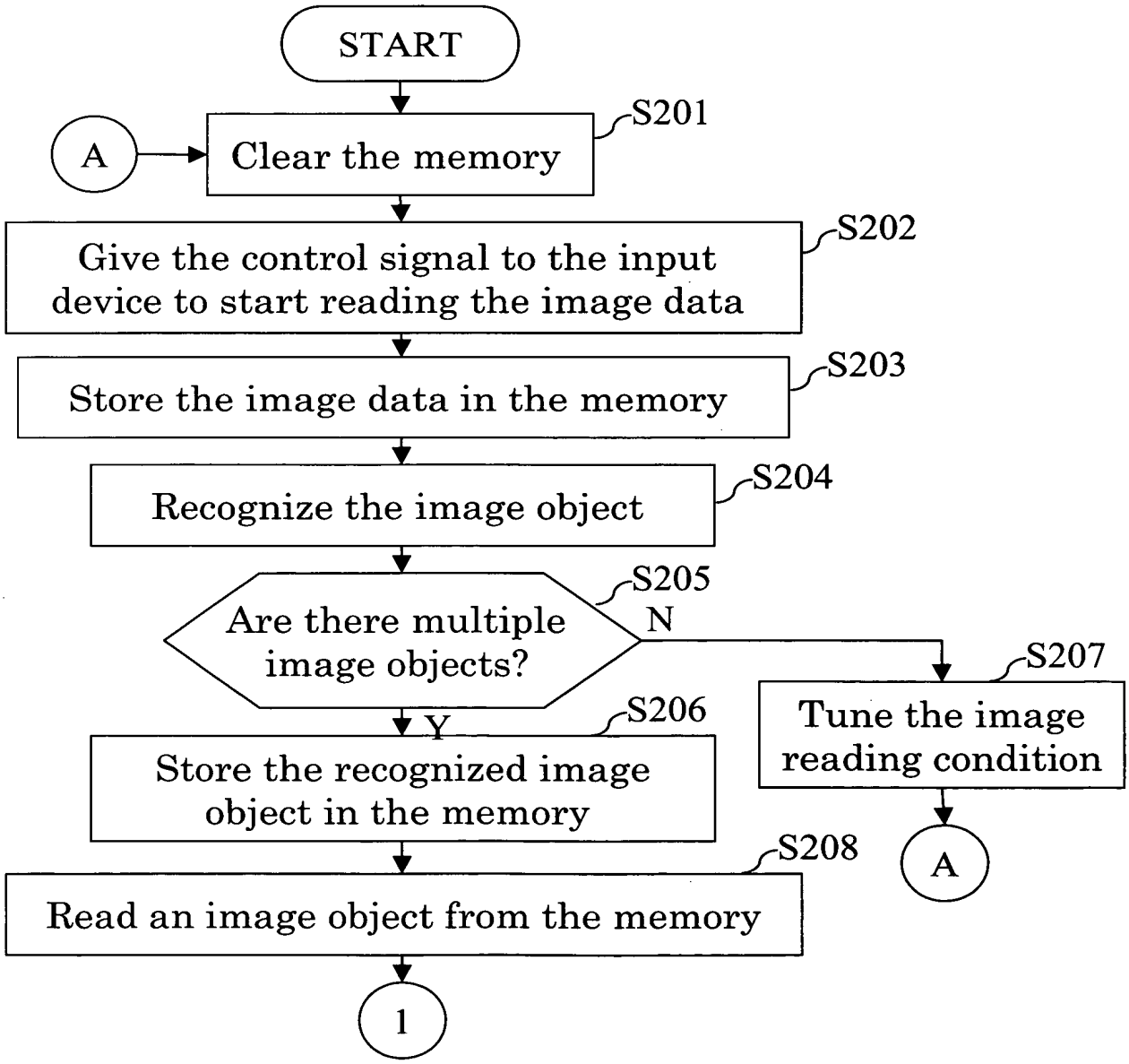


FIG. 36-1

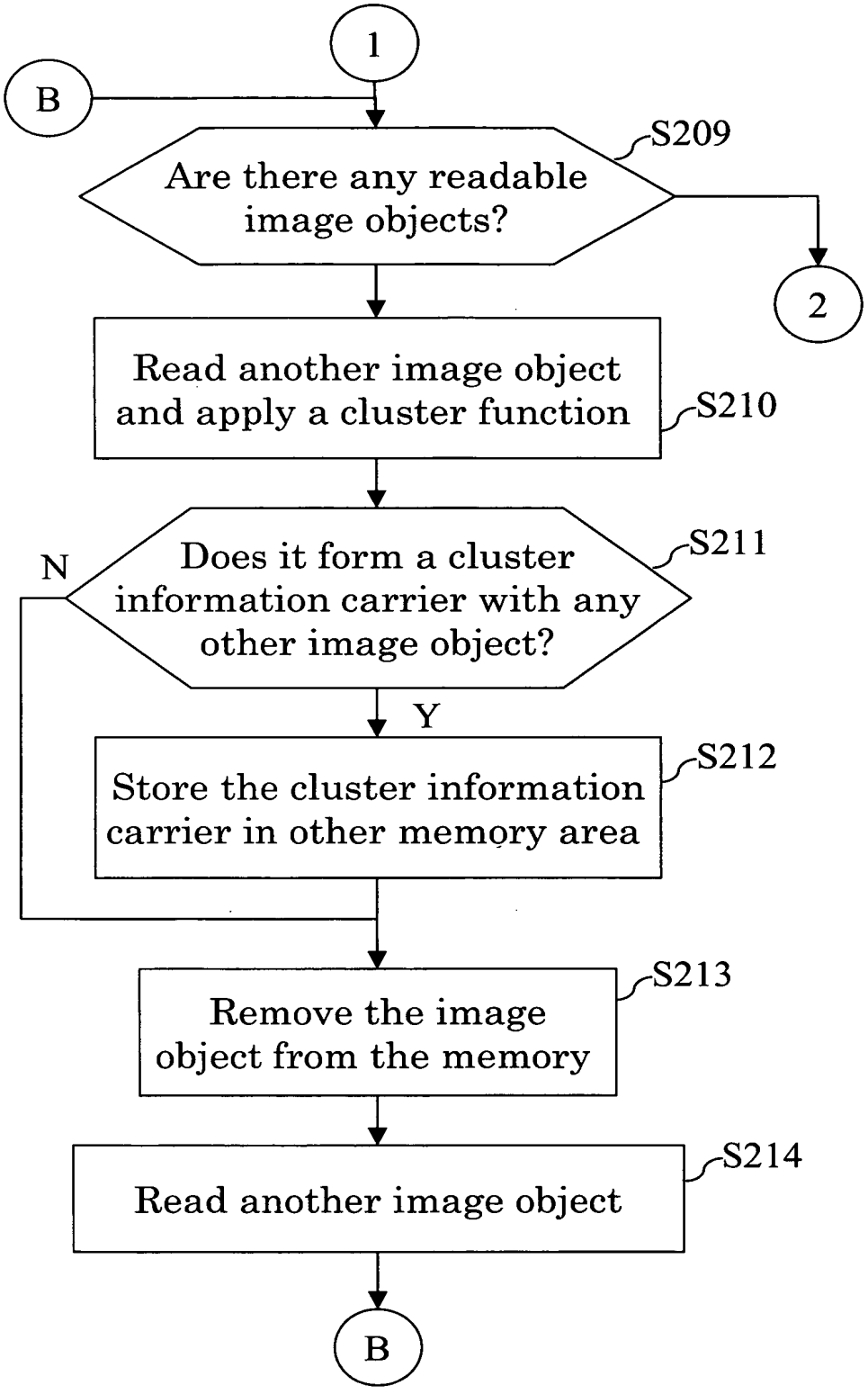

1
B
S209
Are there any readable image objects?
2
Read another image object and apply a cluster function
S210
S211
N
Does it form a cluster information carrier with any other image object?
Y
Store the cluster information carrier in other memory area
S212
Remove the image object from the memory
S213
Read another image object
S214
B

FIG. 36-2

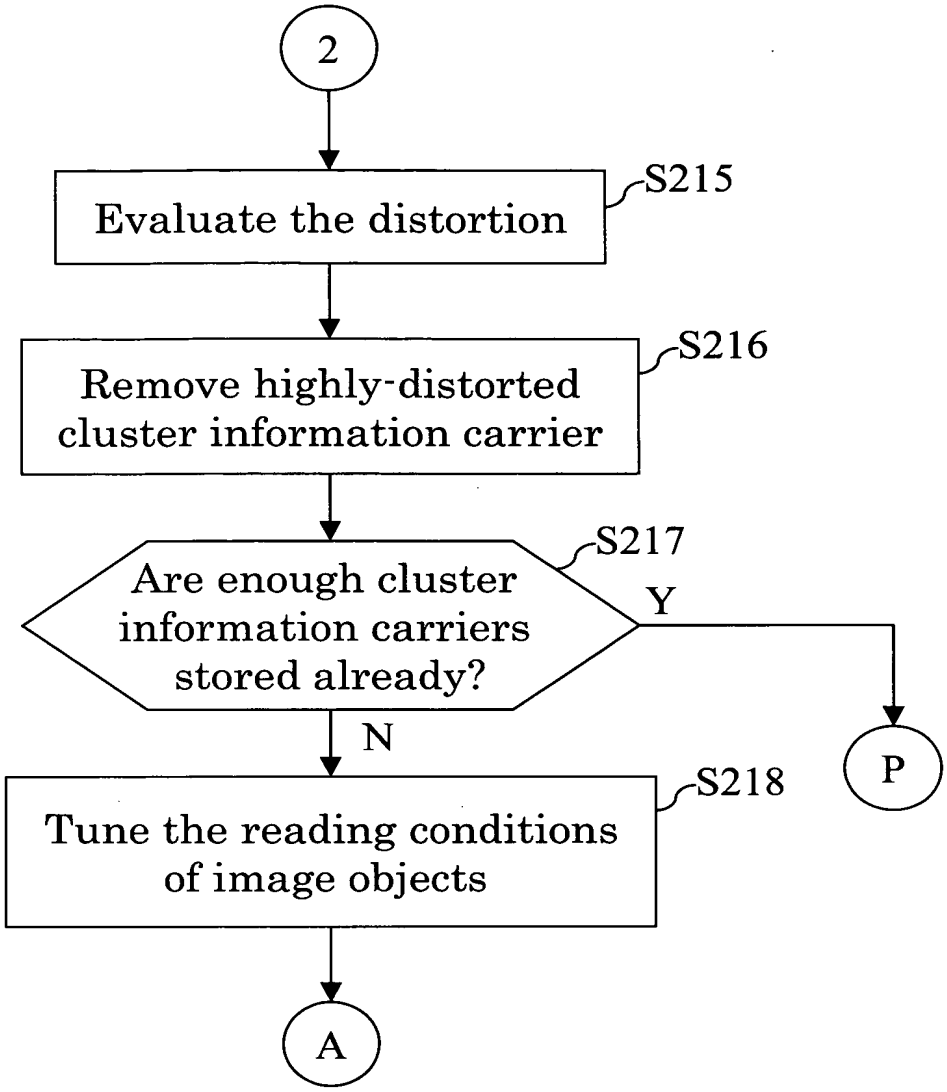

2
Evaluate the distortion
S215
Remove highly-distorted cluster information carrier
S216
Are enough cluster information carriers stored already?
S217
Y
N
P
Tune the reading conditions of image objects
S218
A

FIG. 36-3

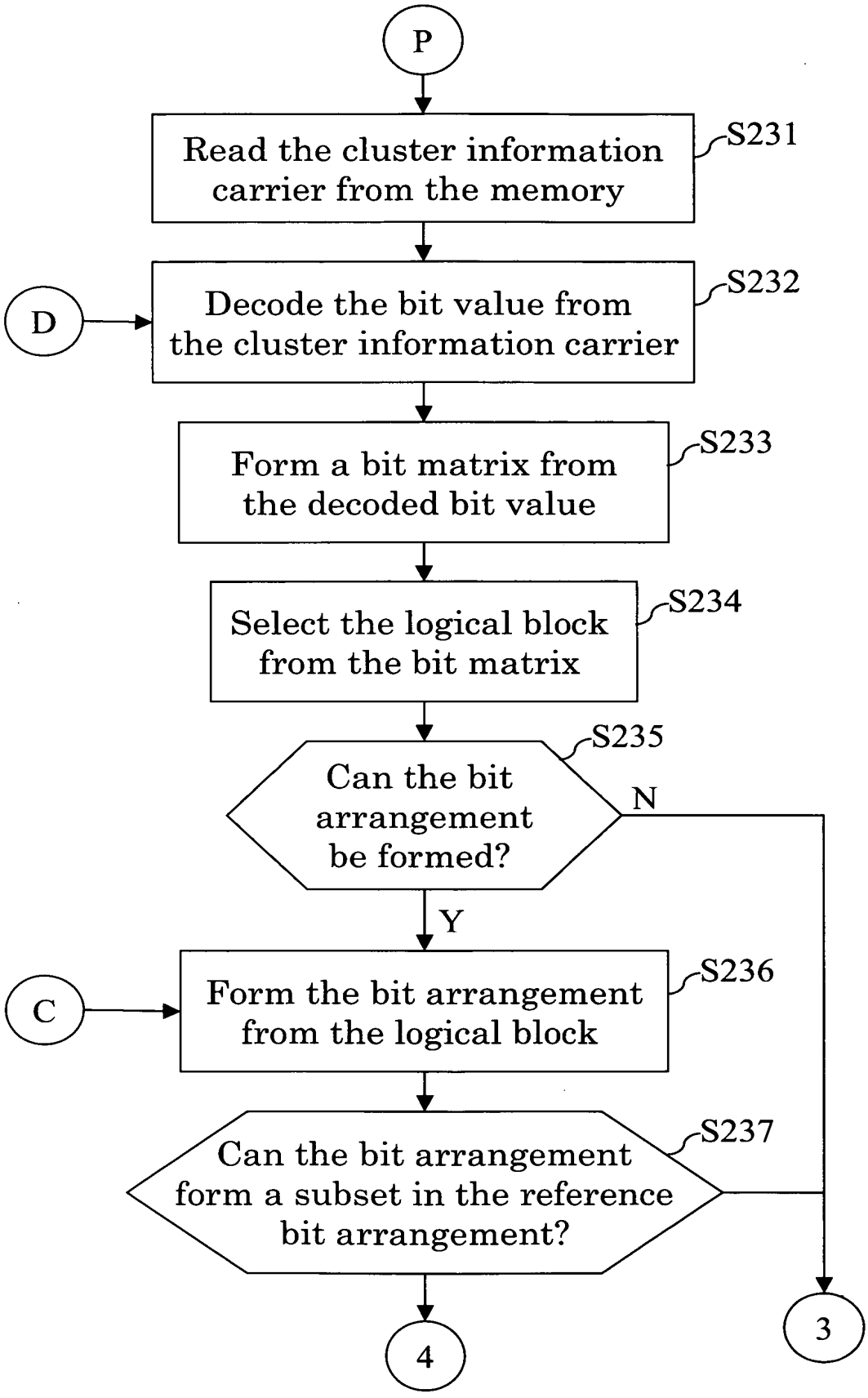

P
Read the cluster information carrier from the memory
S231
D
Decode the bit value from the cluster information carrier
S232
Form a bit matrix from the decoded bit value
S233
Select the logical block from the bit matrix
S234
S235
Can the bit arrangement be formed?
N
Y
C
Form the bit arrangement from the logical block
S236
S237
Can the bit arrangement form a subset in the reference bit arrangement?
4
3

FIG. 37-1

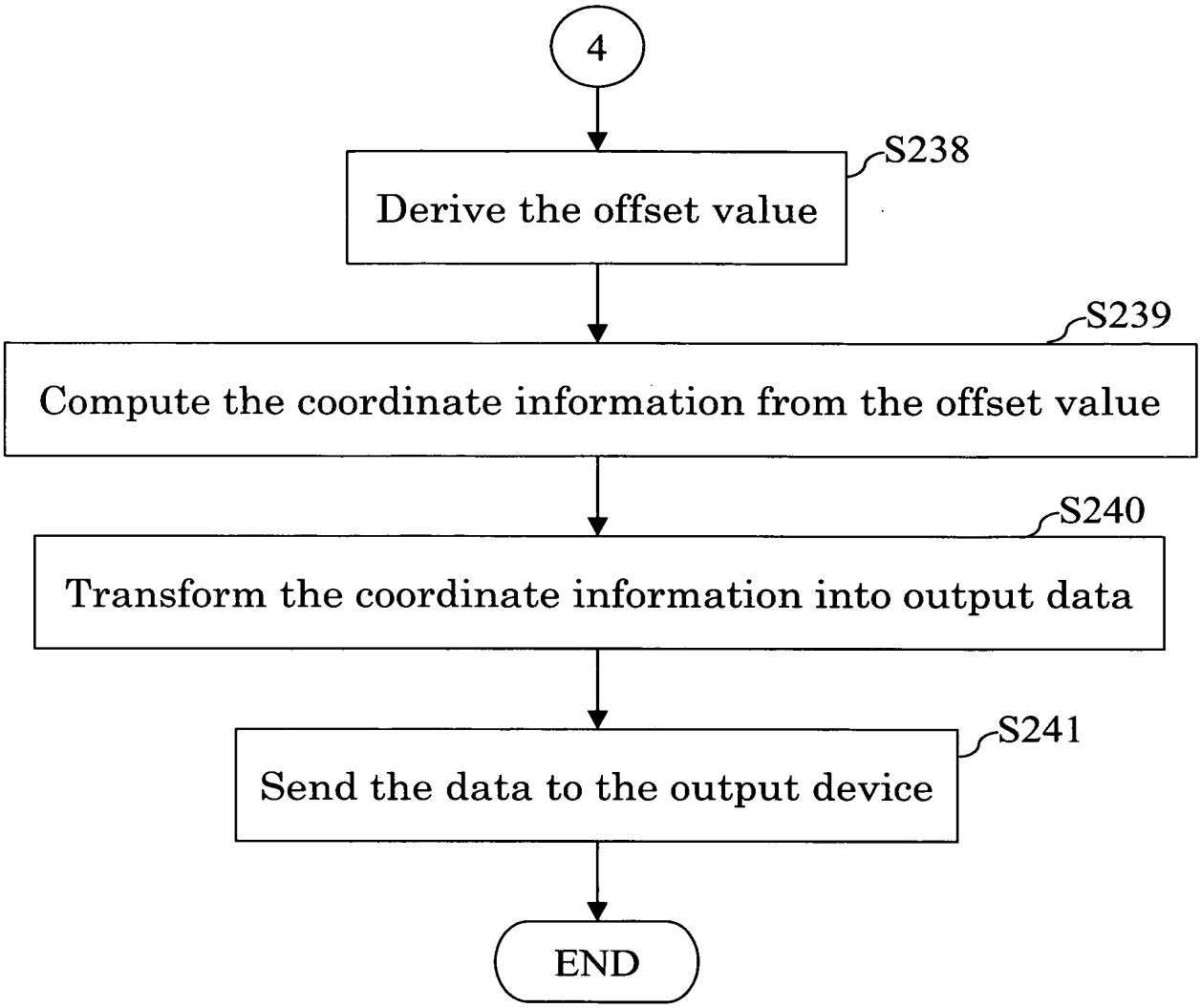

4
S238
Derive the offset value
S239
Compute the coordinate information from the offset value
S240
Transform the coordinate information into output data
S241
Send the data to the output device
END

FIG. 37-2

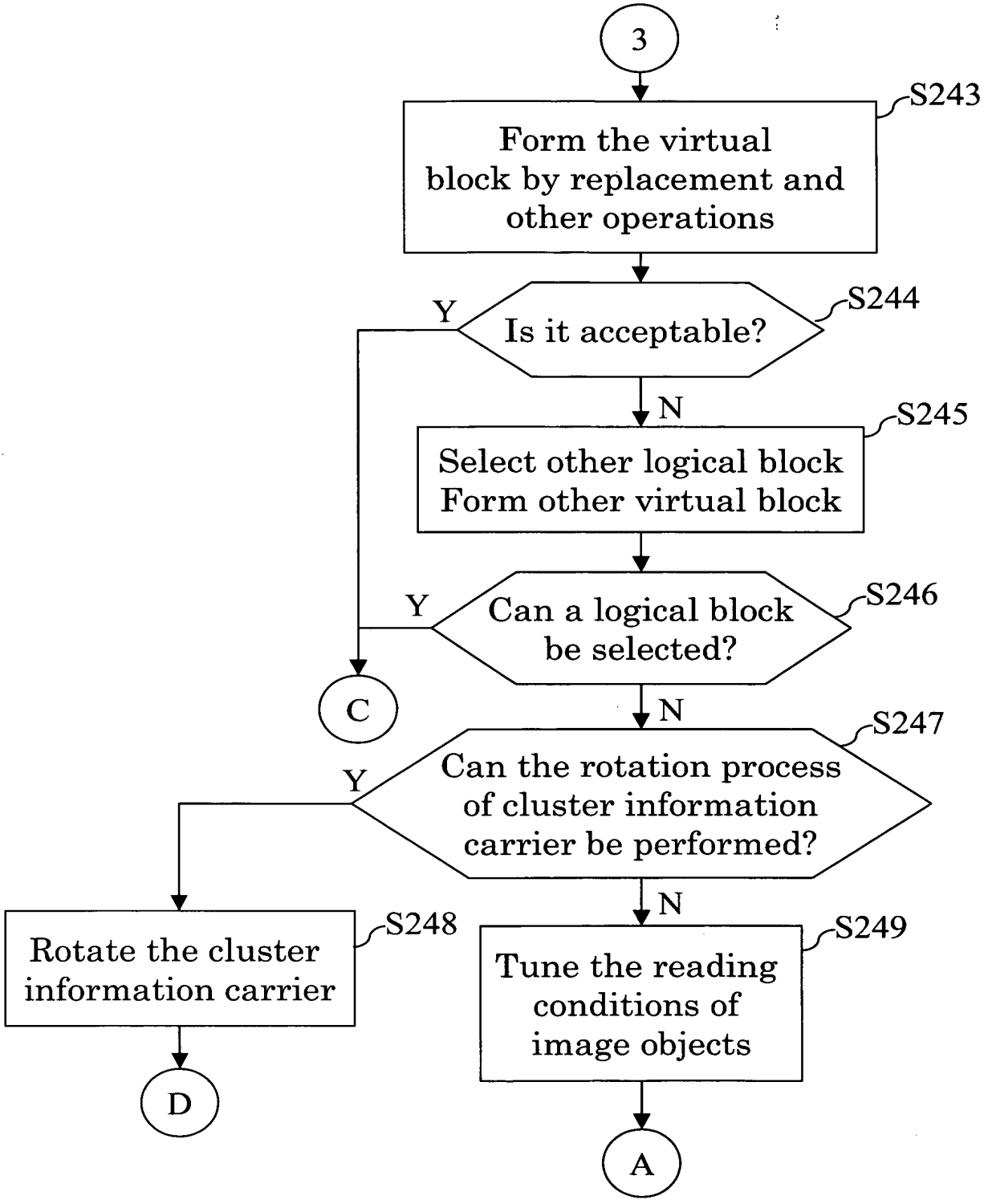

3
S243
Form the virtual block by replacement and other operations
S244
Y
Is it acceptable?
N
S245
Select other logical block Form other virtual block
S246
Y
Can a logical block be selected?
C
N
S247
Y
Can the rotation process of cluster information carrier be performed?
N
S248
Rotate the cluster information carrier
S249
Tune the reading conditions of image objects
D
A

FIG. 37-3

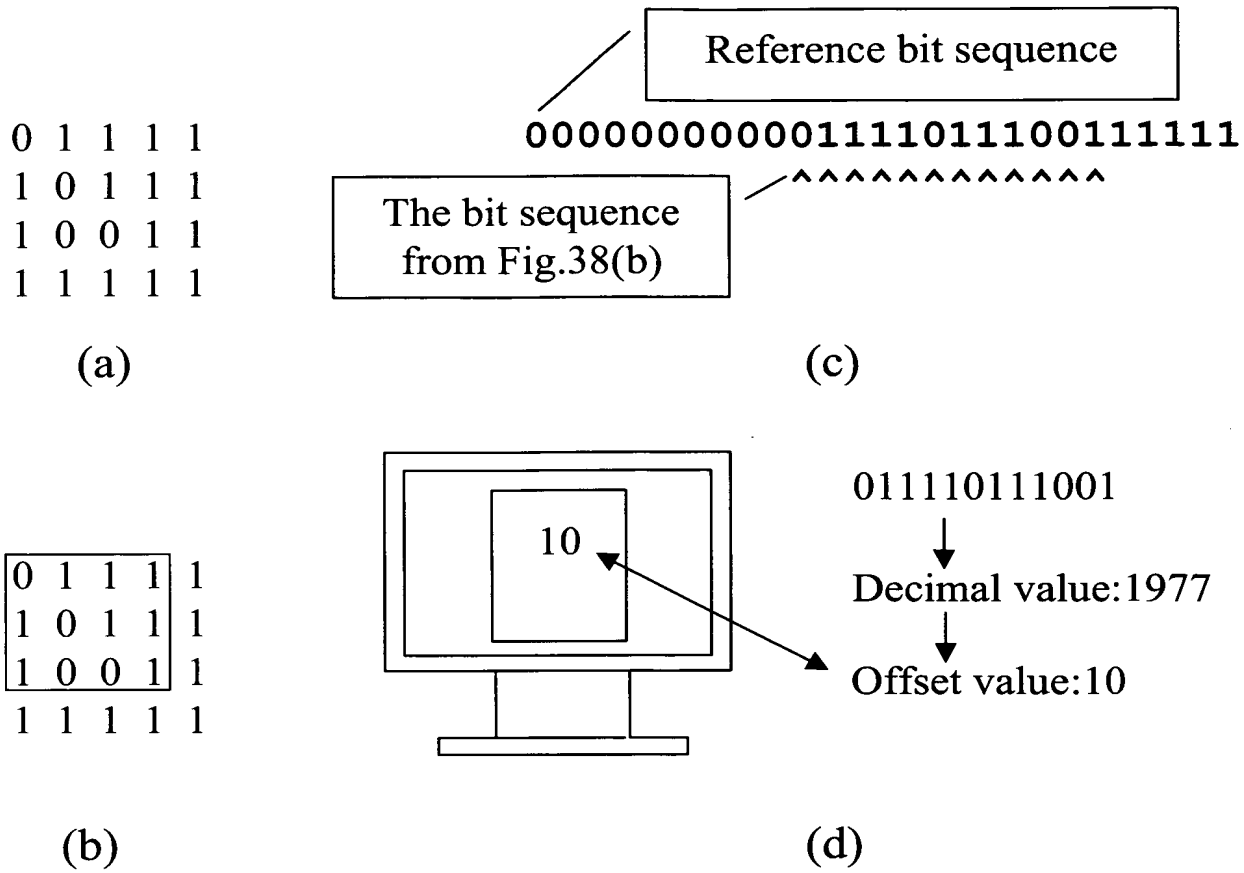

0 1 1 1 1
1 0 1 1 1
1 0 0 1 1
1 1 1 1 1
(a)
Reference bit sequence
00000000000111101110011111 1
The bit sequence from Fig.38(b)
(c)
0 1 1 1 1
1 0 1 1 1
1 0 0 1 1
1 1 1 1 1
(b)
10
011110111001
Decimal value:1977
Offset value:10
(d)

FIG. 38

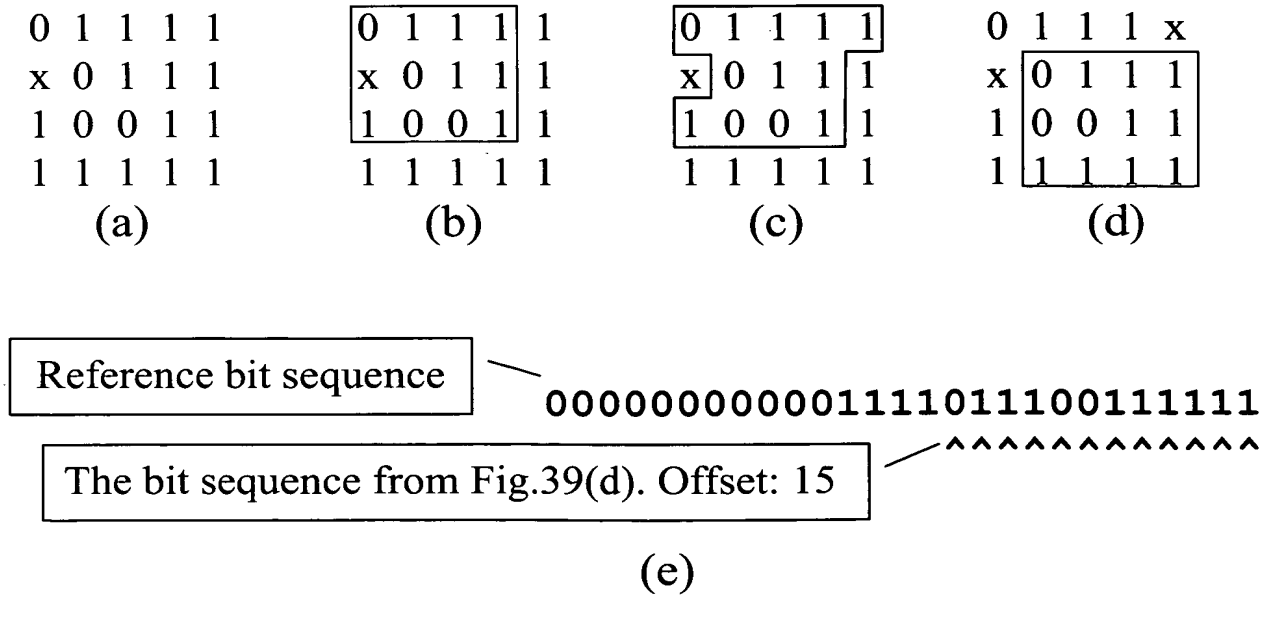

0 1 1 1 1
x 0 1 1 1
1 0 0 1 1
1 1 1 1 1
(a)
(b)
(c)
0 1 1 1 x
(d)
Reference bit sequence
00000000000111101110011111 1
The bit sequence from Fig.39(d). Offset: 15
(e)

FIG. 39